

IN THE SPECIFICATION

Please amend the paragraphs of the specification as follows:

On page 1, please replace the paragraph starting on line 13 with the following amended paragraph:

In wireless communication systems several users share a common communication channel. To avoid conflicts arising from several users transmitting information over the communication channel at the same time requires the use of some form of multiple access protocol, such as ~~code division multiple access~~ Code Division Multiple Access (CDMA). In addition to providing multiple access allocation to a channel of limited capacity, a protocol can serve other functions, for example, providing isolation of users from each other, i.e. limiting interference between users, and providing security by making interception and decoding difficult for a non-intended receiver, also referred to as low probability of intercept.

On page 4, please replace the paragraph starting on line 9 with the following amended paragraph:

There are a number of approaches for using adaptive antenna array technology in wireless communication systems. Some of the approaches are described in U.S. patent Patent No. 6,006,110, entitled “Wireless Communication Network Using Time-Varying Vector Channel Equalization For Adaptive Spatial Equalization” and assigned to Cisco Technology, Inc., San Jose, California.

On page 6, please replace the paragraph starting on line 2 with the following amended paragraph:

The present invention is directed to method and system for forward link beam forming in wireless communications. In one aspect, [of] the invention overcomes the need in the art for reducing interference between users and for increasing system capacity by providing signal transmission using accurate antenna beam patterns. According to one embodiment of the invention, accurate antenna beam patterns are formed on the forward link without incurring

signal transmission overhead on the return link. In one aspect [of] the invention provides accurate antenna beam patterns for signal transmission systems in a way which does not increase the complexity and cost of subscriber units and which is backward compatible with existing systems.

On page 7, please replace the paragraph starting on line 2 with the following amended paragraph:

Figure 1 is an illustrative representation of a sectored cell, with an example of an antenna beam pattern directed toward a user in an exemplary wireless communication system[.] ;

On page 7, please replace the paragraph starting on line 5 with the following amended paragraph:

Figure 2 is a block diagram showing the flow of information in an example beam optimizing module in accordance with one embodiment of the present invention in an exemplary wireless communication system[.] ; and

On page 8, please replace the heading starting on line 1 with the following amended heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

On page 8, please replace the paragraph starting on line 15 with the following amended paragraph:

Figure 1 illustrates an example of wireless communication in a sectored cell using adaptive antenna array beam forming in accordance with one embodiment. Exemplary system 100 shown in Figure 1 constitutes part of an exemplary cellular communication system, which can be, for example, a ~~wideband code division multiple access~~ Wideband Code Division Multiple Access (“WCDMA”) communication system. A WCDMA communication system is also referred to as a “spread spectrum communication system”.

On page 8, please replace the paragraph starting on line 21 with the following amended paragraph:

The general principles of CDMA communication systems, and in particular the general principles for generation of spread spectrum signals for transmission over a communication channel are described in U.S. ~~patent~~ Patent No. 4,901,307, entitled “Spread Spectrum Multiple Access Communication System Using Satellite or Terrestrial Repeaters” and assigned to the assignee of the present invention. The disclosure in that patent, i.e. U.S. ~~patent~~ Patent No. 4,901,307, is hereby fully incorporated by reference into the present application. Moreover, U.S. ~~patent~~ Patent No. 5,103,459 entitled “System and Method for Generating Signal Waveforms in a CDMA Cellular Telephone System” and assigned to the assignee of the present invention, discloses principles related to PN spreading, Walsh covering, and techniques to generate CDMA spread spectrum communication signals. The disclosure in that patent, i.e. U.S. patent 5,103,459, is also hereby fully incorporated by reference into the present application. Further, the present invention may utilize time multiplexing of data and various principles related to “high data rate” communication systems, and the present invention can be used in “high data rate” communication systems, such as that disclosed in U.S. patent application entitled “Method and Apparatus for High Rate Packet Data Transmission” Serial No. 08/963,386, filed on November 3, 1997, issued on June 3, 2003 as U.S. Patent No. 6,574,211, and assigned to the assignee of the present invention. The disclosure in ~~that patent application~~ U.S. Patent No. 6,574,211 is also hereby fully incorporated by reference into the present application.

On page 9, please replace the paragraph starting on line 22 with the following amended paragraph:

Continuing with Figure 1, exemplary system 100 comprises cell 102. Cell 102 can be, for example, one of a number of cells in a WCDMA system. Cells in a WCDMA system are typically divided into 3 sectors. Sectoring of the cells provides various benefits such as more efficient allocation of orthogonal spreading codes, for example. In the example used to illustrate one embodiment in the present application, cell 102 is a sectored cell and includes sector 104. Base station 106 provides communication for users in all sectors of cell 102[,] and, in particular, in the present example, provides communication to user 108 in sector 104. The present example illustrates communication taking place in a forward channel, i.e. from base station 106 to the

subscriber unit of user 108. Adaptive antenna array technology is used at base station 106 to form antenna beam pattern 110 which is directed toward user 108.

On page 10, please replace the paragraph starting on line 14 with the following amended paragraph:

Figure 2 illustrates an example antenna beam optimizing module in accordance with one embodiment. Beam optimizing module 200 as shown in Figure 2 constitutes part of a transmitter which may generally reside in a base station, gateway, or satellite repeater when communication is taking place in a forward channel. Beam optimizing module 200 can be part of a base station transmitter, for example, in a WCDMA communication system or spread spectrum communication system. Beam optimizing module 200, as shown in Figure 2, comprises a control signal monitoring module 202, a signal statistic computation module 204, an antenna beam pattern storing module 206, an antenna beam pattern optimizing module 208, and an adaptive antenna array module 210. The flow of information between modules is indicated in the block diagram of Figure 2 by the arrows between modules, which also indicate the direction of information flow.

On page 11, please replace the paragraph starting on line 2 with the following amended paragraph:

Continuing with Figure 2, control signal monitoring module 202 comprises hardware for reading a control signal returned by the user on the return link and making the information in the signal available at the output of control signal monitoring module 202. For example, the control signal can be a power control bit which appears on the return link approximately every 1.25 milliseconds, as discussed above. The power control bits can be stored in a buffer or register, for example, or can be passed directly to other modules in the system. Although the present example uses power control signals to illustrate one embodiment, it is manifest that other existing user feedback control signals can be used without sacrificing the invention's advantages of not increasing complexity at the subscriber unit and backward compatibility. For example, the ~~data rate control~~ Data Rate Control ("DRC") signal can be used in a wireless data communication system such as a ~~high data rate~~ High Data Rate ("HDR") communication system. The details of

implementing control signal monitoring module 202 for a particular type of control signal are apparent to a person of ordinary skill in the art.

On page 14, please replace the paragraph starting on line 13 with the following amended paragraph:

Figure 3 shows a flowchart 300 describing one example of a process of providing accurate beam forming in accordance with one embodiment. Flowchart 300 shown in Figure 3 describes a process which can be performed at a transmitter which may generally reside in a base station, gateway, or satellite repeater when communication is taking place in a forward channel. The process shown in flowchart 300 can be performed by a beam optimizing module, for example, in a base station transmitter in a WCDMA communication system or spread spectrum communication system.

On page 16, please replace the paragraph starting on line 20 with the following amended paragraph:

It is appreciated by the above description that the invention provides method and system for forward link beam forming in wireless communications. According to an embodiment of the embodiments [are] described above, user information is transmitted in a communication signal from a base station to a user using adaptive antenna array technology to form a narrow antenna beam pattern directed toward a user. The antenna beam pattern is optimized for each particular user, thus minimizing signal interference between multiple users in a wireless communication system and resulting in increased system capacity. Moreover, according to an embodiment of the invention described above, the method of narrowing and directing the antenna beam pattern toward a user provides more accurate beam forming and better optimization than other methods. Although the invention is described as applied to communications in a CDMA system, it will be readily apparent to a person of ordinary skill in the art how to apply the invention in similar situations where accurate antenna beam pattern forming is needed to increase system capacity and reduce interference between users in a wireless communication system.

On page 17, please replace the paragraph starting on line 11 with the following amended paragraph:

From the above description, it is manifest that various techniques can be used for implementing the concepts of the present invention without departing from its scope. Moreover, while the embodiments ~~are has~~ have been described with specific reference to certain embodiments, a person of ordinary skill in the art would recognize that changes can be made in form and detail without departing from the spirit and the scope of the invention. For example, different existing feedback control signals, such as ~~data rate control~~ Data Rate Control (DRC) signals, can be used as well as the power control signal used in the present example. Also, for example, the dithering algorithm presented in one embodiment described here, can be replaced by other algorithms for optimizing the beam pattern. The described embodiments are to be considered in all respects as illustrative and not restrictive. It should also be understood that the invention is not limited to the particular embodiments described herein, but is capable of many rearrangements, modifications, and substitutions without departing from the scope of the invention.

On page 18, please replace the paragraph starting on line 1 with the following amended paragraph:

Thus, the method and system for forward link beam forming in wireless communications have been described.